Information Acquisition and Excessive Risk-Taking: Impact of Subdued Market Risk and Low Interest Rates

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Motivation

- Current debate among policy makers:
  Stein (2012), Bernanke (2012), Financial times (April 17, 2013)
- Empirical support:
  - potential causes of the crisis?
Paper contribution

- Endogenous information acquisition:
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  - a driving force for overaccumulation of risk?
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  - unlike the capacity constraint common in the literature
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- **Two learning functions considered:**
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Two learning functions considered:
- a linear
Paper contribution

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- Two learning functions considered:
  - a linear
  - an entropy based
Main results

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- In low volatility environment there is more investment into risky asset
  - and less investment into information acquisition
  - as a result larger portfolio risk than in high volatility environment
Set Up

- 1 sector (banks)
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- 2 types of assets: risky and risk free
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- 2 periods
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- 2 types of assets: risky and risk free
- 2 periods
- 1st period is divided into 2 subperiods
Set Up continued

Bank’s balance sheet:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk free, pays $R^s_t$</td>
<td>Endowment/Deposits</td>
</tr>
<tr>
<td>Risky, pays $R^r_{t+1} \sim N(\mu, \sigma^2_t)$</td>
<td></td>
</tr>
</tbody>
</table>

Bank’s expected next period portfolio return:

$$E_t \Pi_{t+1} = k_t^b (\hat{\mu}_t - R^s_t) + d_t R^s_t - b_t$$
Information Acquisition:
close to Van Nieuwerburgh and Veldkamp (2010)

1st subperiod:
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2d subperiod:
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- 2d subperiod:
  - information signals are realized
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- **1st subperiod:**
  - Prior $\mu_t \sim N\left(R^r_{t+1}, \sigma^2_t\right)$
  - Information budget, $b_t$, and posterior variance, $\hat{\sigma}^2_t$, is chosen with $\hat{\mu}_t = N\left(\mu_t, \hat{\sigma}^2_t\right)$

- **2d subperiod:**
  - Information signals are realized
  - $\hat{\mu}_t$ is formed using Bayes rule
  - And portfolio is chosen: $k^b_t = \frac{\hat{\mu}_t - R^s_t}{\rho \hat{\sigma}^2_t}$
Mean-Variance Utility

\[
\max_{b_t, k_t^b} E_t \Pi_{t+1} - \frac{1}{\rho} \text{Var} (\Pi_{t+1})
\]

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k_t^b = \frac{\hat{\mu}_t - R_t^s}{\rho \ast \hat{\sigma}_t^2}
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subject to a learning rule:
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subject to a learning rule:

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\[
\log_2 \left( \frac{\sigma_t^2}{\hat{\sigma}_t^2} \right) a \leq b_t
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- linear

\[
\left( \sigma_t^2 - \hat{\sigma}_t^2 \right) a \leq b_t
\]
Mean-Variance Utility
Linear Constraint

Figure: Mean-Variance Utility with Linear Learning

- - - risky asset holdings, $k^b_t$
--- (blue) portfolio variance

......... information budget, $b_t$
--- (black) steady state portfolio variance
Mean-Variance Utility

Figure: Mean-Variance Utility with Entropy Learning

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  - \( z_{t+1} \sim N(z, \sigma_t^2) \)
Figure: Response to a Change in Monetary Policy
Mean-Variance Utility
Linear Constraint

Figure: Response to a Change in Initial Variance
Mean-Variance Utility

Figure: Response to a Change in Monetary Policy
Mean-Variance Utility

Entropy

Figure: Response to a Change in Initial Variance
Conclusion

- The model replicates excessive risk-taking in low interest rate and low volatility environment
- Low interest rates stimulate risk-taking:
  - search-for-yield
  - information acquisition
- Low volatility environment:
  - may stimulate risk-taking
  - amplifies effect of low interest rates